The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXV. No. 637 SEPTEMBER 12, 1931 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.5.0

Contents

	PAGE
EDITORIAL: Sound Business Principles; Thin Films in Corrosion Problems; The Price of Silver	223
Vanadium Catalysts in Acetic Acid Manufacture	225
Micro-Methods in Chemical Analysis	226
International Congress of Leather Chemists	226
Chemical Industry Tennis Tournament Finalists	227
Shipping, Engineering and Machinery Exhibition	227
From Week to Week	228
Patent Literature	229
Weekly Prices and Market Reports	232
Company News	236
Commercial Intelligence	238
DYESTUFFS MONTHLY SUPPLEMENT: Basic Intermediates for Dyestuffs, XLV.; Dyes and Textiles; Dyes and their Application; Peroxide Bleaching	13–18

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Sound Financial Principles

THE House of Commons at a memorable sitting on Tuesday registered its confidence in the National Government by 309 votes to 250. This majority of 59 is sufficient for the task immediately ahead, which is that of re-establishing British credit by the only method which the business man, from practical experience of his own affairs, can regard as sound. That method is the balancing of the national accounts. Judged by this test, Mr. Henderson, the new Leader of the Opposition, put himself completely out of court with the business community at the very beginning of his reply to the Prime Minister. Mr. Henderson thought it was right that the Government should try to balance the Budget, but he did not agree that it should be called upon to balance the Unemployment Fund at one step and at the same time. No responsible head of a business could possibly separate his accounts in this way. What Mr. Henderson proposes in effect is that there should be two separate national accounts, one balanced and the other showing an ever-increasing deficit. No surer road to ruin could be imagined if this method of accountancy were to be applied to a private trading concern. The blunt truth is that the pound sterling will not maintain its value unless the whole national account is made to square and the finance of the Unemployment Fund be treated, as it ought to have been treated from the beginning, as part of the Budget of the year.

This question of value is at the root of the matter. It may be difficult for most of us to obtain an intimate knowledge of the working of the intricate machinery of international finance and of the highly technical details of banking and currency. It should, however, be simple enough for all men to appreciate the importance of getting value for value. The Prime Minister gave as his reason for forming the National Government and resisting the half measures which Mr. Henderson advocated, his profound conviction that that was the only way by which the value of the pound sterling could have been maintained. The financial crisis had become so severe—what Mr. Snowden called "an economic blizzard" in the early part of the year had suddenly assumed the proportions, in Mr. MacDonald's language, of "a typhoon"—that there was imminent danger of the value of British money tumbling without control. "One day," the Prime Minister said, "it would have been 20s. and the next day 10s." He gave a homely illustration to press home his point. He had agreed to a 20 per cent. cut in his official salary and would far rather have the £4,000 a year which would be left with the pound sterling capable of buying the same goods as before, than get his old cheque for £5,000 with the pound sterling tumbling in value. He would, in fact, be in pocket by the £1,000 cut and steadily out of pocket by the maintenance of his salary at £5,000 a year. The position of every man and woman in this country, employer and workman alike, is exactly the same as that of the Prime Minister. Let the value of the pound sterling fall, and the value of profits and wages will be decreased in an ever-growing ratio.

If it is absolutely essential in the national interest to secure a general understanding of the difference between real wages and wages embodied in a scale of figures, it is equally important that there should be a right appreciation of the meaning of the word "economy" in the solution of this crisis. Every reference to economy during the current discussions, both in Parliament and outside it, must be interpreted as applying to economy in public expenditure. Public economy is the imperative need of the time for reasons which every business man understands. He needs less expenditure on State and municipal services and fewer taxes in order to have a better opportunity to increase the capital sunk in his own business, thereby affording more employment and giving in turn more spending power to the individual citizen. The national trade balance has been upset in the last few years, largely by the expansion of State and municipal expenditure and by the contraction of the expenditure of private individuals. If the balance is to be swung the other way, there must be more public economy with its natural corollary of more money for the development of trade and fuller purses in the hands of every-

body for the purchase of much-needed commodities. Private economy implies wise spending. It is in the long run a question of getting value for value, and wholesale reduction of private expenditure would be a false method of dealing with the crisis. Sweeping cuts in the public services are necessary because the public authorities cannot afford their present scale of expenditure. No private trader or artisan could ever be in that position; he would have gone bankrupt first. Accordingly, his position in the present state of affairs is not that of a blind economiser but of a wise spender. It cannot be too often emphasised that public economy is the only sure road to more private spending, on the assumption that the average man when dealing with his own money behaves prudently and demands value for value.

The crisis is by no means over, but there can be no doubt that the first phase has been successfully passed. It is all to the good that a majority of the members of the House of Commons have kept their heads. The nation has shown wonderful coolness in an unexampled situation. The final responsibility in the long run will rest upon the great trading community which has made this country what it is. It has only to apply to national affairs the sound principles of finance which it demands of its own directors and counting house to ensure a return to normal conditions. A great responsibility is also a great opportunity, and it is for everyone who realises the dangers through which the country is passing to assist in the education of his fellows in sound financial principles.

Thin Films in Corrosion Problems

THE twenty-fourth annual autumn meeting of the Institute of Metals takes place, by invitation of the Schweizerische Verband für Materialprüfung (Swiss Association for Testing Materials), in Zürich, commencing on Sunday, September 13. This meeting, which will be attended by over two hundred members representing fifteen different countries, will open with a notable contribution towards our present-day knowledge of corrosion, Mr. Ulick R. Evans being the author of a paper on thin films in relation to corrosion problems. It is anticipated that Mr. Evans will reveal some facts of outstanding interest relating to the natural oxide films which are produced on certain metals, such as aluminium, and upon the rôle played by certain additions to metals which may either result in an increase in the resistance of the surface film or a tendency for this surface film to break down with ultimate destruction of the metal. To be useful, protective surface films must be self-healing; in other words, they must be partly in the nature of secondary corrosion products which form so close to the weak points in such films that they automatically seal any defects which exist in that part produced by primary corrosion. There are so many phases which cannot be explained on purely mechanical or purely chemical principles, and this is yet another instance where greater collaboration between the engineer and the chemist is called for. To discuss corrosion in Zürich seems to be particularly appropriate, because the cleanliness of the industrial quarter of this town affords ample support for the view that a foul, corrosive atmosphere is not a necessary accompaniment of industrial activities. Zürich, too, is memorable for the important researches on corrosion, carried out by von Wurstemberger, Honegger, Köhlschütter and others.

The Price of Silver

AN unofficial international conference of financial experts is to meet in Paris on September 17, under the auspices of the International Chamber of Commerce, to study the problem of the depressed price of silver. We are informed that experts have been invited from the United Kingdom, France, India, China, Japan and the United States, and that this conference has been primarily called to advance, if possible, a suggestion to prevent wide fluctuations in price. Ever since the discovery of the New World, with its immense wealth of silver, the price of this metal has continuously declined. The downward movement was slow up to within a century ago, but since then, great changes have taken place. In the autumn of last year the metal reached a record low price level of 1s. 4d. per oz. troy, and there has been a further drop in price this year, the present price being around 1s. 1d. The future is in the balance; there are some who think that it will sink still lower, but the majority believe that the 1930 prices will be more or less maintained. All are agreed, however, that whatever the exact value of silver is in the future, it will be one that places the metal well within the reach of the industrialist, for the world production during the first half of the current year was about 100,000,000 fine ounces, a quantity which cannot possibly become absorbed by the world's mints and silversmiths. This, of course, is of especial interest to the chemical industry, where silver is now finding many uses in the construction of plant for food processing, acetate silk manufacture, mercerising and dyeing operations, and generally in the handling of acetic acid and caustic alkalis. Its resistance to acetic acid has, indeed, given silver its chief use in chemical plant construction. Silver condensers are used for the recovery of solvents in acetate silk factories, but in the viscose rayon industry the sulphurous nature of the liquids to be handled at present prohibits the use of either the pure metal or its alloys.

Books Received

SOLUBILITY OF NITROGEN IN WATER AT HIGH PRESSURES AND TEMPERATURES. By John Ben Goodman. Reprint from *Industrial and Engineering Chemistry*. Pp. 16.

FURTHER APPLICATIONS IN THE USE OF BROMATE IN VOLUMETRIC ANALYSIS. By Horace Hopkins Bliss. Urbana, Illinois. Pp. 8.

REPORT ON TRADE AND ECONOMIC CONDITIONS IN BULGARIA DURING 1930 AND FIRST SIX MONTHS OF 1931. London: Department of Overseas Trade. Pp. 28. Reference No. C.3641.

The Calendar

Sept.		
14–15	Institute of Metals: Annual Autumn Meeting	Zürich.
17	Institute of Fuel: Visit to works of Shell-Mex Co. at Shell Haven.	London.
18	Faraday Society: "The Passivity of Metals." Professor W. J. Müller. 5.30 p.m.	Burlington House, London.
18–20	National Smoke Abatement Society: Third Annual Conference.	Liverpool.
18–21	Association of Special Libraries and Information Bureaux: Eighth Annual Conference.	Lady Margaret Hall, Oxford.

Vanadium Catalysts in Acetic Acid Manufacture

A Résumé of the Patent Literature

The literature dealing with synthetic methods for the production of acetic acid, starting with the hydration of acetylene to acetaldehyde and the oxidising of acetaldehyde to acetic acid, contains many references to the use of vanadium catalysts for both of these steps. The following résumé of this literature is taken from the current number of "The Vancoram Review," which is issued quarterly by the Research Department of the Vanadium Corporation of America.

THE exceedingly rapid growth of the acetic acid market during the past seven or eight years has brought forth various new and cheaper methods of production. Until about fifteen years ago the chief uses of acetic acid were in the dyeing of textiles and in the manufacture of acetates. The introduction of nitro-cellulose lacquers in the period after the war caused a great increase in the production of organic acetates. Ethyl acetate production from 1923 to 1929 increased from approximately 25,000,000 to 73,000,000 pounds. Butyl acetate production in the same period went from 1,800,000 to 38,700,000 pounds and amyl acetate production from 1922 to 1928 grew from 1,690,000 to 4,290,000 pounds. The unusual development of cellulose acetate rayon in the last few years brought about additional consumption of acetic acid. Approximately, 4,700 tons of acid were consumed in 1927 and it is estimated that 11,000 tons were used in 1929 with an equal amount of anhydride. Increased interest in home motion-picture photography has necessitated greater production of the cellulose acetate safety film.

Until 1928, all the acetic acid manufactured in the United States was a by-product of the distillation of wood. Now the acid is made synthetically by a number of different processes. Many of the steps in this synthesis are controlled by catalysts and, while not the most used, vanadium catalysts have an important place in this development.

Hydration of Acetylene to Acetaldehyde

In 1920, British patent 154,579, granted to A. Wohl, stated that in the catalytic hydration of acetylene to acetaldehyde, mercury salts may be replaced by salts of heavy metals which are not volatile, and which are not appreciably transformed into oxides at temperatures below a red heat (for example basic zinc vanadate). The acetylene is mixed with a considerable excess of air and steam, and under favourable conditions, at about 360° C., 75 to 80 per cent. of the theoretical yield of acetaldehyde, together with 5 per cent. of acetic acid, is obtained. British patents 124,194 and 132,529 granted to Societe des Acieries et Forges de Firminy in 1919 describe a process for manufacturing acetaldehyde in which acetylene is passed through a catalyzing liquid consisting of sulphuric acid containing mercury salts together with small quantities of ferric salts and vanadium compounds. The liquid, which gives no sludge during use, is regenerated by electrolytic oxidation. The aldehyde vapour carried along by the excess of acetylene is polymerized by treatment with sulphuric acid of 15 to 20 per cent. strength. The paraldehyde is separated and depolymerized by boiling with dilute sulphuric acid. The aldehyde vapours are oxidized to acetic acid by treatment with air or oxygen in the presence of a catalyst consisting of copper permanganate or a mixture of Cu and Mn salts. Alternatively, the paraldehyde is oxidised by electrolysis of 10 per cent. sulphuric acid on which floats a layer of the paraldehyde. Acetic acid is distilled off when it reaches a high concentration.

In 1926, Pascal studied in detail the conversion of acetylene to acetaldehyde by a continuous process using a two per cent. solution of mercuric sulphate in an acid medium and found that increasing the temperature to about 65° C. increased the speed of the reaction. When a ternary catalyst containing mercury, iron and vanadium in the atomic proportions 2:2:0·2 was used, the total yield of acetaldehyde was 10·5 per cent. and the ratio aldehyde to mercury was 9:2.

Oxidation of Acetaldehyde

In regard to the second stage of this two-step process, French patent 479,656, granted to C. Dreyfus in 1914, suggested vanadium pentoxide for the oxidation of acetaldehyde (obtained from the catalytic oxidation of C_2H_2) by air to acetic acid, as does British patent 108,459 and U.S. patent 1,286,256 of H. Dreyfus granted in 1917 and 1918 respectively.

In 1920 Neumann and Schneider performed some experiments in the laboratory to determine the most desirable conditions for carrying on the reactions occurring in the one-step conversion of acetylene into acetic acid. Their data show that the best results were obtained by using a mercuric sulphate-acetic acid catalyst with the addition of vanadium pentoxide. The acetylene and oxygen were introduced alternately. Yields of acetic acid as high as 83 per cent. of the theoretical were obtained by this process. An early patent (French Patent 473,158 of 1914, British patent 14,113 of 1914 and U.S. patent 1,174,250 of 1916) stated that acetic acid is readily synthesized by the interaction of acetylene, oxygen and the requisite amount of water in the presence of salts of mercury. The reaction is carried out in acetic acid. Contact substances such as vanadium pentoxide may be used in addition to the mercury salts. The best results are obtained by introducing acetylene and oxygen alternately into the acid mixture containing the contact substance.

In Germany the I.G. has been most active recently in patenting processes for synthetic acid direct from acetylene. British patent 304,855 of 1927 shows the trend of this work; it describes a process by which acetylene is passed with hydrogen and oxidizing gases (air) over a catalyst having both oxidizing and hydrating properties. For producing acetaldehyde, salts of mercury or vanadium at 120° C. are used, while to obtain acetic acid, vanadates of tin, silver or mercury at 200–250° C. are employed.

Oxidation of Alcohol to Acetic Acid

The effectiveness of vanadium catalysts for the oxidation of alcohol to acetic acid has been known for a long time. In 1892 Walter's experiments using vanadium oxide showed that alcohol could be converted into acetaldehyde and acetic acid. His work was purely qualitative but indicated the great potentialities of the reaction and was afterward protected by patents. In 1907 Grunstein and Behrens, as well as Neumann, Moeser and Lindenbaum showed by series of experiments that vanadium pentoxide is a very active oxidation catalyst for transforming ethyl alcohol (either in the vapour or liquid state) mixed with air, into acetaldehyde and acetic acid. U.S. patent 1,636,952 granted to A. E. Craver (Barrett Co.) in 1927 treats of the catalytic oxidation of ethyl alcohol with air at 300° C. to acetaldehyde using vanadium pentoxide as a catalyst, a yield of 85 per cent. being obtained. Mixed catalysts comprising V-Mo and V-Mo-W give better results. British patent 238,933 granted to E. B. Maxted and B. E. Coke in 1924 is typical of this process. It states that aliphatic and aromatic alcohols and aldehydes may be oxidised to acids by passing their vapours mixed with air over various metallic vanadates (preferably that of tin) heated to about 300° C.

Recent patents of considerable interest suggesting still another raw material are those of H. Dreyfus (British patents 337,014 and 337,410 of 1930) in which oxides of carbon and hydrogen in the presence of catalysts consisting of ferrites, ferrates, cobaltites or cobaltates of alkali or alkaline earth metals and of aluminium, preferably at 250–350° C. and under 50–500 or more atmospheres, are converted into ethyl alcohol, acetaldehyde and acetic acid. The reaction gases may be coke oven, producer or water gas and may be wholly or in part replaced by oxygenated organic compounds as methyl or ethyl alcohol. (Methane may wholly or in part replace the hydrogen, and nitrogen may also be present.) The catalyst employed may be used in association with zinc, magnesium, calcium, aluminium, chromium, molybdenum and vanadium, either as metals, oxides or other compounds.

A New Form of Synthetic Leather

DR. BARKER, of the Wool Industries Research Association, Torridon, Leeds, who is attending the forthcoming conference of the British Association in London, will explain a new process for making synthetic leather from woollen fibre. The new product has a polished surface, and beneath this surface it has all the elements of hard felt. It is uncrackable by bending, and to shoe manufacturers it should be especially of interest.

Micro Methods in Chemical Analysis

New Technique for Gases, Solids and Solutions

THREE noteworthy papers on the present aspect of micro methods in chemical analysis were read before the industrial and engineering chemistry division of the American Chemical Society on the occasion of their 82nd Meeting at Buffalo, N.Y., August 31 to September 4.

Dealing with the microanalysis of gases, Dr. F. G. Cottrell states that the property of indefinite expansion and simple molecular-volume relations of gases offers unique possibilities for quantitative microchemical determinations which have thus far, however, been woefully neglected by chemists, especially in the direction of organic analysis. The fundamental elements of the necessary technique, particularly the methods for measurement of very low gas pressures, have of late years been thoroughly worked out by physicists and even applied by them to special cases closely paralleling the daily needs of the organic and physiological chemists. What is mainly needed now is the popularisation of this technique among chemists by its reduction to ready-made and reasonably simple equipment for mass production of routine analyses. Herein lies the opportunity for the mechanician with vision and ingenuity to apply the known facts and methods of the physicist to the every day needs of the chemist who is either too busy with his own routine or perhaps too overawed by the apparent strangeness and delicacy of the apparatus to undertake the development himself.

Speeding Up Analytical Results

Dr. E. M. Chamot has taken for his subject a study of micro-analytical methods in the rôle of time and labour savers. He emphasises the fact that microchemical and microscopical detection and determination of ions and compounds usually assures obtaining results with super-rapidity and with a degree of certainty and of accuracy as great as by the use of standard microscopic methods. That these time and labour-saving methods have not yet been more generally adopted is doubtless due to an erroneous idea that the specific field of micro-methods is restricted to the analysis of small amounts of material or to the detection and determination of "traces." A far more important phase of this type of analysis is the rapidity with which results can be obtained and at very low cost.

Microchemical quantitative analyses are based upon the same principles and procedures as those employed in ordinary chemical analyses. It therefore follows that, with few exceptions, any standard methods may be made applicable to the analysis of very small samples, and as small amounts are employed and small volumes of liquids are handled the time required for precipitations, filtrations, ignitions, etc., is greatly shortened. Everything therefore appears to be in favour of a more universal use of microchemical methods. Microscopical quantitative analyses on the other hand, are restricted to certain types of material and to certain specific conditions, but are nevertheless worthy of far more attention than they have thus far received, for when applicable they afford the chemist the most rapid of all methods of analysis at negligible cost and on material which can be analysed in no other way. A combination of micro-analytical determinations and microscopical detections and estimations can also be made to effect great economies in control laboratories. For this reason the microscope and the spectograph have come to be absolutely indispensable in all chemical laboratories.

Estimating Extremely Small Amounts in Solution

Magneto-optic methods of analysis are outlined in the paper by Professor F. Allison. These methods, which have been in the experimental stage for the past four years, have yielded results in the study of compounds in solution which indicate that it should be found of value in certain problems related to the following lines of research: (1) Qualitative analysis, particularly in cases of extremely small amounts of materials; (2) quantitative analysis, with an accuracy under best conditions of two to three significant figures; (3) the study of isotopes; and (4) the detection of intermediate compounds in certain chemical reactions. Sensitivity of the order of one part in one billion parts is anticipated, there is non-interference from other substances present, and the sample itself is unaffected by the analysis.

International Congress of Leather Chemists

Noteworthy Papers at Basle

BY invitation of the Swiss Association of Leather Trades Chemists, the International Congress of Leather Chemists will open at Basle, on Monday, September 14, under the presidency of Dr. Schulthess, the participating Societies being the International Society of Leather Trades Chemists, the International Association of Leather Trades Chemists, and the Swiss Association of Leather Trades Chemists. Representatives will also attend from the American Leather Chemists Association. The Conference will continue until Friday, September 18, the following papers, amongst others, being presented:—

"The Composition and Properties of Chrome Tanning Extracts," by Prof. Dr. E. Stiasny; "Dyeing of Fur Skins," by Dr. V. Casaburi; "The Determination of pH of Tanning Extracts," by Dr. D. Burton; "The Oxidation of Dilute Solutions of Sodium Sulphide by Exposure to Air," by L. Meunier and Kapp; "The Reaction of Tannic Acid with Hexamethylenetetramine (A New Qualitative Test for Tannin)," by A. T. Hough; "The Fixation of Tannins in Leather and its Effect on the Resulting Product," by A. T. Hough; "Solid Chrome Tanning Compounds," by W. R. Atkin; "The Detection of Sulphite Cellulose in Vegetable Tanning Extracts," by Prof. Dr. O. Gerngrosse; "The Combination of Collagen and Dyestuffs," by Drs. Bravo and Baldracco; "Modern Processes for Extraction of Tanning Materials and Dyewoods," by Dr. M. Tottoli; "Modern Characteristics of the Quick Tannage of Sole Leather," by Dr. Belavsky and Ing. Fiksl; "The Influence of Neutral Salts on the Swelling and Degradation of Hide Substance by Alkaline Solutions," by A. Kuntzel; "Contributions to the Theory of Chrome Tanning," by Prof. Dr. Ing. E. Elod and W. Siegmund.

During the Conference, there will be displayed in the adjoining Exhibition Building a comprehensive exhibit of hides and leather, showing defects in different stages; various defects in finished manufactures such as shoes; and the effects of polishes and finishes. Special exhibits have been prepared by the Research Station of St. Gallen (Switzerland), and by Swiss chemical manufacturers.

Consolidation of Cement Companies

AT extraordinary general meetings of the Dunstable Portland Cement Co., Ltd., the Holborough Cement Co., Ltd., and the British Standard Cement Co., Ltd., held at Winchester House, London, on Friday, September 4, resolutions were unanimously adopted empowering the directors to carry into effect provisional agreements made between the respective companies and the Associated Portland Cement Manufacturers, Ltd., for the sale of the goodwill, freehold and leasehold properties, plant and machinery, and manufacturing stocks of the companies. A similar resolution was submitted at an extraordinary general meeting of Greaves, Bull and Lakin (Harbury Works), Ltd., but was opposed by Mr. M. C. L. Freer on the ground that as the shareholders had not received any accounts since March, 1930, they could not form an opinion of the value of the assets. A proposal to adjourn the meeting was defeated, and the original resolution was carried.

Trade with South America

THE articles relating to South America which appeared in THE CHEMICAL AGE during the early part of this year have now been collected together in the form of a book and will be published shortly under the title, *A Merchant Adventurer in South America*. The author, Mr. John Benn, has added some vived impressions of his travels in order to give a picture of life in these countries. In a chapter on the Chilean nitrate industry he describes the plant at Maria Elena, which he was the first English journalist to visit. The book contains statistics covering British trade with Central and South America for the past three years, which are claimed to be the most comprehensive statistics at present available relating to these markets. It will be published by Ernest Benn, Ltd., at 6s. net.

Chemical Industry Tennis Tournament Finalists

S. B. GANE.

D. E. RAINE.

S. NEWMAN.

E. J. LAWRENCE.

THE Finals of the Chemical Industry Lawn Tennis Tournament, organised by THE CHEMICAL AGE, will be played off to-day, Saturday, September 12, at the York Gate Tennis Courts, York Gate, Regent's Park, London (a few minutes walk from Baker Street Station), when the Benn Brothers' Annual Tennis Tournament will also be held.

Messrs. S. B. Gane and D. E. Raine of Johnson Matthey and Co., Ltd., Birmingham, will play Messrs. S. Newman and E. J. Lawrence of The Industrial Chemist, London, and the winners will be presented with the Silver Challenge Cup given by Benn Brothers, Ltd. (the proprietors of THE CHEMICAL AGE). Graesser-Monsanto Chemical Works, Ltd., have very generously provided four miniature cups, which will be presented to the finalists.

Any members of the chemical industry who are interested are invited to witness the match, which will commence at 2.30 p.m.

Shipping, Engineering and Machinery Exhibition

Olympia, September 10-26

THE twelfth biennial International Shipping, Engineering and Machinery Exhibition opened at Olympia, London, on Thursday, September 10. Official visits will be made by a large number of institutions and societies, including the British Chemical Plant Manufacturers' Association (Tuesday, September 15), the British Cast Iron Research Association (Friday, September 18), the Society of Chemical Industry (Saturday, September 19), the Iron and Steel Institute (Wednesday, September 23), and the Institute of Metals (Friday, September 25). The Institution of Chemical Engineers arranged to hold their official visit on Friday, September 11.

Among the exhibitors are the following: Alfa-Laval Co., Ltd. (various types of the De Laval oil purifiers); Babcock and Wilcox, Ltd. (steam raising plant); Batterium Metal and Vislok, Ltd. (a new all-British acid and corrosion resisting copper-aluminium-nickel alloy for the construction of chemical plant); Benn Brothers, Ltd. (THE CHEMICAL AGE and numerous other trade papers); Edward Bennis and Co., Ltd. (stokers embodying new features); The British Oxygen Co., Ltd. (oxy-coal-gas leadburning plant); British Quadruplex, Ltd. (rotary valveless pumps and compressors); Brown Bayley's Steel Works, Ltd. (stainless iron and steel); Chance Bros. and Co., Ltd. (glass silk for heat insulation); Drayton Regulator and Instrument Co., Ltd. (temperature recording and regulating apparatus); Elliott Bros., London, Ltd. (heat economy and control apparatus); Evershed and Vignoles, Ltd. (water testing apparatus); Thos. Firth and John Brown, Ltd. (stainless steel).

Other exhibitors include Foster Instrument Co. (electrical pyrometers of all types); J. and E. Hall, Ltd. (refrigerating machinery); I.C.I. Metals, Ltd. (non-ferrous metals); India Rubber, Gutta Percha and Telegraph Works Co., Ltd. (rubber hose); Kelvin, Bottomley and Baird, Ltd. (various instruments, gauges and indicators); The Mond Nickel Co., Ltd. (products in nickel and nickel alloys); Negretti and Zambra (mercury-in-steel distance thermometers); Nor-Rust Liquid Lead Co., Ltd. (rust resisting coatings for iron and steel); Reavell and Co., Ltd. (air compressors); Rotary Air Compressor Co., Ltd. (compressors and vacuum pumps); Sarco Co., Ltd. (fuel economy instruments); Separators, Ltd. (oil separators); Siebe, Gorman and Co., Ltd. (safety appliances and equipment); L. Sterne and Co., Ltd., (refrigerating machinery); Thompson Bros., Bilston, Ltd. (rotary displacement pumps), and James Walker and Co., Ltd. (packings and jointing materials for pipes and glands).

Forest Products Research in India

THE Progress Report of Forest Research Work in India has recently been released. It contains a very informative survey of the bamboo pulp and paper industry. Bamboo paper was made and supplied to the government presses at Calcutta and Simla, for printing the report. A consignment of very badly mildewed bamboo was received from the Titagur Paper Mills, in order that experiments might be carried out to ascertain whether it would be possible to produce clean white paper from such material, and these experiments proved very successful.

It is understood that the two London financial groups which are making plans for the production of bamboo pulp in Burma have joined forces and have nearly completed plans for the erection of a pulp mill for the production of unbleached bamboo pulp on a large scale.

White Lead Developments in Soviet Russia

FOR use in the manufacture of white lead, Soviet Russia is at present obliged to import metallic lead from abroad. To overcome its lack of domestic supplies, however, the Lakokraska (paint and varnish) Trust, in its Yaroslav plant is now extracting lead from lead carbonate minerals. Several deposits of lead carbonate minerals are found in the Union, located at Tourlansk, which contain an average content of 15 to 17 per cent. of metallic lead. While efforts have been made to restrict the domestic use of white lead, the paint trust is promoting an increase in output of the pigment. Production of white lead in Russia amounted to about 18,000 metric tons in 1913, but the average annual output is now approximately 2,000 tons.

From Week to Week

SEVERAL WORKMEN were fatally injured when a steam boiler exploded at an oil refinery at Bacau, near Bucharest, on Tuesday, September 8.

DR. T. S. WHEELER has resigned his post with Imperial Chemical Industries, Ltd., on appointment as principal and professor of organic chemistry at the Royal Institute of Science, Bombay.

THE DYESTUFFS AND CHEMICAL BUSINESS of the Newport Chemical Corporation (United States), as conducted at its Carrollville (Wisconsin) plant, has been consolidated with the dyestuffs department of E. I. du Pont de Nemours and Co., of Wilmington, Delaware.

A NEW PYROXYLIN FACTORY is scheduled to begin production of pyroxylin plastic in Czechoslovakia during this month. The factory will work up the wind-fall timber in the Pelhrimov district (Bohemia), thus providing a local market for damaged wood.

THE LONDON HEADQUARTERS of the India Rubber, Gutta Percha and Telegraph Works Co., Ltd., have been moved from Cannon Street to more spacious premises at Aldwych House, London, W.C.2. Their new telephone number is Holborn 8461.

A PLANT FOR SYNTHETIC NITRIC ACID is being operated at Chauny (France), in the Etablissements de la Société de Saint-Gobain. This factory makes use of part of the ammonia manufactured at Waziers, and has an average production of 40 tons of 36 per cent. acid per day.

AT THE FORTHCOMING GENERAL MEETING of the Calico Printers' Association a resolution is to be submitted converting the issued share capital into stock. It is proposed that the stock shall be transferable in units of £1, and it is not intended to call in the existing share certificates.

TWO BILLINGHAM MINERS, Abraham Kelly, of Cheviot Crescent, and William Moses, of Roscoe Road, were killed on Tuesday, September 8, at the Synthetic Ammonia and Nitrates Works. They were working in the anhydrate mines when they were caught by a fall of stone roof.

ROBERT EDWARDS (25), of Bergholt Road, was killed, and Frederick Bareham (26), of West Bergholt, was seriously injured in an explosion at Wells fireworks factory, Colchester, on Tuesday, September 8. The men were working in a small filling shed which was blown to pieces, and the town was shaken by the explosion.

THE CHEMICAL WORKS DEPARTMENT of the Belfast Gas Company announce that a contract has been made for the supply of 400,000 gallons of their petroleum substitute which has been evolved by chemists of the department. The output of the Belfast works is estimated at 500,000 gallons per annum but it is anticipated that a larger plant will be installed early in 1932. The price of the oil is 4d. per gallon.

JOSEPH BENTON, of Cromer Road, Hartshill, Stoke-on-Trent, has been fined £10 for practising as a patent agent without being registered. The prosecution was brought by the Chartered Institute of Patent Agents, and evidence was given that Benton was formerly a registered patent agent but ceased to be entitled to practise in August, 1930, when his name was erased from the register. It was stated that he was fined £5 for a similar offence in January last.

THE LAST BLAST-FURNACE IN OPERATION at the Trent Ironworks, Scunthorpe, is to be damped down shortly owing to the continued depression in the iron and steel industry. It is understood that about 100 employees will be given notice. These works belong to Firth, Brown and Co., Ltd., of Sheffield, and normally two of their three blast-furnaces are working. For some time, however, only one furnace has been operating, and owing to accumulation of stocks through bad trade this furnace is also to cease output.

AT THE FORTHCOMING ANNUAL CONFERENCE of the Association of Special Libraries and Information Bureaux (" Aslib "), at Lady Margaret Hall, Oxford, September 18-21, Sir Frederic Nathan is reading a paper on " International Abstracting and Indexing." The delegates will be entertained to dinner on Friday, September 18, when Mr. H. T. Tizard, F.R.S., Rector of the Imperial College of Science and Technology, will deliver his presidential address. The present chairman of the " Aslib " Council is Dr. R. S. Hutton, director of the British Non-Ferrous Metals Research Association.

A TAR BOILER CAUGHT FIRE in the Clyde Iron Works, Tollcross, Glasgow, last week, causing damage estimated at £200. The outbreak spread to the staging and several wooden moulds, which were destroyed.

MR. SAMUEL DONALD, who was manager of Dundee Corporation tar distillation works until they were recently taken over by a private company, has been appointed by the Corporation to test and blend coals coming into the gasworks.

THE history, properties, and uses of the metals tantalum, tungsten, molybdenum, caesium, rubidium, and columbium comprise the subject matter of a 70-page book issued by the Fansteel Products Co., Inc., North Chicago, Illinois. This publication is so written as to be of special interest to those who would employ these metals in their own work and to those who use devices made possible by their properties.

IT IS REPORTED that the recent retrenchment in manufacturing activity in the Griesheim Works of the I.G. Farbenindustrie, a section of which is devoted to the manufacture of compressed gases and autogenous welding apparatus, and another section to the production of chromates, was made because other plants of the I.G. Farbenindustrie produced sufficient amounts of these chemicals to supply the present slackened demand.

A NEW HIGH TEMPERATURE REFRACTORY ALLOY has been developed by the Heraus Vakuumschmelze of Hanau (Germany), and is proving especially advantageous in enamelling furnaces. The operating life of this alloy, which is known as Chroman, is said to be 200 times as long as that of the iron normally used for furnace construction. In addition, Chroman has the advantage of being 30 to 50 per cent. lighter than an equivalent grate of iron.

H.M. TRADE COMMISSIONER AT SINGAPORE, Mr. R. W. Boulter, is at present in the United Kingdom and will be available at the Department of Overseas Trade and at certain provincial centres for the purpose of interviewing firms interested in trade with British Malaya, for a short period from October 5. Firms desirous of meeting Mr. Boulter should apply to the Department of Overseas Trade, 35, Old Queen Street, S.W.1., quoting reference 2861/1/31.

IT IS EXPECTED that the Modderfield factory of the African Explosives, Ltd., will be completed by the end of September and opened by the Prime Minister of South Africa, Mr. J. B. M. Hertzog. This factory is for the manufacture of synthetic ammonia and nitric acid, and is being erected under the supervision of Imperial Chemical Industries. With the completion of this factory, South Africa will be independent of outside supplies of nitrates for agricultural and military purposes. Most of the nitrate at present used in South Africa is obtained from Chile, and the ammonia from Europe, as sulphate of ammonia.

MORE THAN 6,000,000 CUBIC FEET of helium has been shipped from the Amarillo helium plant for use in the new giant airship " Akron " recently constructed for the United States Navy. This plant is operated under the supervision of the United States Bureau of Mines, and since its establishment a little over two years ago, it has produced more than 22,000,000 cubic feet of helium at an average net cost for that period of $11.47 per thousand cubic feet. An indication of present improved plant performance, brought about by experience in plant operation and improvements in process and equipment constantly introduced, is given in production figures for June of this year, when the net cost of $5.95 per thousand cubic feet was attained.

Obituary

JOSEPH BRINDLE WHEWELL (managing director of J. and W. Whewell, Ltd., New Bridge Chemical Works, Radcliffe).

ALFRED TREWARTHA JAMES, the well-known metallurgist, and past president of the Institution of Mining and Metallugry, died at Johannesburg on September 5, whilst visiting the Rand in connection with litigation against the mining industry regarding gold extraction processes for which he claimed to own patent rights, chiefly with regard to the use of cyanide.

CLINTON PAUL TOWNSEND, since 1920 head of the patent department of the Union Carbide and Carbon Corporation, of the United States, aged 63. Mr. Townsend was best known for his invention of the Townsend cell and his activities in promoting electrochemistry. He was also associated with Doctor Baekeland in developing the technic for the manufacture of Bakelite.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

348,970. Diammonium Phosphate. Kunstdunger Patent-Verwertungs-Akt.-Ges., Glarus, Switzerland. International Convention date, August 23, 1929.

In the manufacture of diammonium phosphate ammonia is absorbed in a saturator containing a boiling solution of phosphoric acid or monoammonium phosphate and the escaping ammoniacal steam is passed into a second saturator containing a dilute solution of phosphoric acid produced, for example, by leaching phosphate rock with sulphuric acid or with another mineral acid and an alkali sulphate. The escaping steam is preferably used for pre-heating the phosphoric acid. Crystals of diammonium phosphate are separated directly or after cooling in a centrifuge, the mother liquid being returned together with monophosphate from the second saturator which has been concentrated after separation of insoluble impurities containing iron, aluminium, calcium, etc. Several modifications of the process are described.

348,986. Nitric Acid. Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges., 72, Aeschenvorstadt, Basle, Switzerland. International Convention date, September 14, 1929. Addition to 289,412. (See The Chemical Age, Vol. XVIII, p. 615.)

Ammonia is burnt with oxygen or gases rich in oxygen and the resulting gases containing higher oxides of nitrogen and rich in oxygen are absorbed according to the process of the parent Specification, the concentration of the nitric acid used in the initial stage being not less than that which would be in equilibrium with the nitrogen oxides in the treated gases. The waste gases are replenished with oxygen and returned to the ammonia combustion chamber.

349,004. Oxyarylsulphides. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 12, 1929.

Bis-(hydroxyaryl)-sulphides or polysulphides or their substitution products, which have valuable disinfectant, insecticidal, fungicidal and preservative properties, are obtained by condensation in known manner of alkoxythiophenols or their substitution products with alkoxyhalogenbenzenes in presence of alkali, followed by saponification in known manner of the resulting bis-(alkoxyaryl)-sulphides. Arsenic acids of the products may be prepared. Numerous examples are given.

349,017. Vinyl Halides. J. P. Baxter, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, February 12, 1930.

To produce vinyl halides acetylene and a hydrogen halide are combined in presence of active carbon which has been preliminarily treated with the same hydrogen halide at a temperature (200–600° C.) higher than that of the subsequent reaction (100–300° C.). The catalytic activity may be restored at intervals by substituting a stream of the hydrogen halide for the reacting gas mixture and raising the temperature.

349,036. Dyes. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 19, 1930.

Vat dyes are produced by condensing thiophenanthrone- or benzanthrone-carboxylic acid halides with cyclic di- or polyketones containing a free amino group, the condensation being advantageously effected in presence of solvents with or without acid-binding agents. Numerous examples are given.

349,022. Acetaldehyde. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 15, 1929.

The production of acetaldehyde by introducing acetylene into an aqueous liquid containing a mercury salt and an acid in the absence of an organic solvent for acetylene, is effected at a raised pressure of 0·8–1·5 atmospheres and at a temperature of 85° C., an excess of acetylene of high concentration being used. The process may be made continuous by supplying fresh catalyst solution to the reaction vessel at the point where the gas enters and simultaneously withdrawing a corresponding amount of liquid. The excess of acetylene, after separation of the acetaldehyde, is returned to the reaction vessel.

349,037. Arsinic Acids. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 19, 1929.

o-Nitroarylarsinic acids, which are valuable intermediates for the manufacture of synthetic drugs, are obtained by diazotising an *o*-nitroarylamine in presence of arsenious acid or of an arsenite, without a reducing agent, and with or without the presence of a soluble salt of an organic acid and of an accelerator such as copper or its compounds, animal charcoal or kieselguhr. In one example 2 : 4-dinitroaniline is converted into 2 : 4-dinitrophenyl-1-arsinic acid by diazotisation in presence of sodium arsenite, sodium acetate, and kieselguhr or animal charcoal. Other examples relate to the production of 7- (or 6-) nitro-3-hydroxy-1 : 4-benzisoxazine-6- (or 7-) arsinic acid and 2-nitrophenyl-1-arsinic acid.

349,059. Dyes and Intermediates. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 15, 1929.

High molecular pyridino compounds, which according to their constitution may be vat dyes, intermediate products for the dyestuff and pharmaceutical industries, pigment dyes, acid wool dyes, or acetate silk dyes, are obtained by condensing cyclic amino compounds having a condensed ring system containing at least four carbocyclic rings, in which at least one position ortho to the amino group is occupied by hydrogen or by a group readily split off, with glycerol or a derivative thereof (*e.g.* epichlorhydrin) in sulphuric or phosphoric acid and in presence of dehydrogenating agents. The products may be further condensed, halogenated, or nitrated, if desired. Numerous examples are given.

349,060. Hydrogen. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 18, 1929.

Hydrogen, alone or in admixture with carbon monoxide and other gases, is produced from hydrocarbons or from materials containing hydrocarbons by a process comprising treatment with air or oxygen in a chamber substantially free from carbonaceous matter to produce substantially complete oxidation, and causing the resulting gases to act on hot coal, coke or other carbonaceous materials. The carbon monoxide may be subjected to catalytic conversion to dioxide, the latter being absorbed, if desired, and the residual mixture of hydrogen and nitrogen (when air is used in the first stage) may then be used for the synthesis of ammonia. Examples relate to the use as starting materials of industrial waste gases and of a mixture of liquid hydrocarbons.

349,061. Carbon Disulphide. Imperial Chemical Industries, Ltd., Millbank, London, and J. McAulay, Winnington Hall, Northwich, Cheshire. Application date, December 19, 1929.

Carbon disulphide is extracted from gas mixtures by scrubbing with a solvent mixture comprising a stripping oil suitable for benzol recovery, *i.e.* a coal tar distillate such as creosote oil, and heavy paraffin oil, boiling at or above 300° C., and subsequent recovery from the solvent, *e.g.* by steam distillation. The process is particularly applicable to the treatment of the exit gases obtained in the process of Specification 331,734 (see The Chemical Age, Vol. XXIII, p. 234).

349,067. Acetylene ; Carbon Monoxide-Hydrogen Mixtures. Soc. d'Etudes Scientifiques et d'Entreprises Industrielles, Assignees of E. Voituron, Ougrée, Belgium. International Convention date, January 14, 1929.

Saturated hydrocarbons or gases rich in saturated hydrocarbons are rapidly passed in admixture with steam and oxygen through a reaction chamber heated to 1300° C. or higher

to produce gas mixtures containing acetylene, carbon monoxide, and hydrogen. The proportion of oxygen used is such as to destroy substantially the whole of the hydrocarbons, and the volume of steam used should be about half that of the hydrocarbon-oxygen mixture. The reaction chamber may be heated externally by burning a part of the hydrocarbon to be treated. After removal of the acetylene and carbon dioxide from the gas mixture, the residual gas contains carbon monoxide and hydrogen in proportions suitable for the direct synthesis of methanol.

349,080. DYE INTERMEDIATES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 20, 1930.

Anthraquinone-1:2-thioglycollic acid is heated with an organic acid anhydride to yield a mixture of products of which one series contains the thiophenanthrone structure, and consists mainly of thiophenanthrone-2-carboxylic acid, and the other series contains an oxythiophene ring, and consists mainly of anthraquinone-1:2-acyloxythiophene. These main products may be separated either by dissolving out the carboxylic acid with dilute soda or sodium carbonate or by treating the mixture with an organic diluent in which the thiophene derivative is more soluble. If the heating is not prolonged, C-carboxy-thiophenanthrone-2-carboxylic acid may be isolated as an intermediate product. It is possible to predetermine the relative yields of the two series of products by varying the conditions of the reaction. Five examples are given.

349,097. 1:1:2-TRICHLORETHANE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 11, 1929.

Acetylene is treated with hydrogen chloride in presence of catalysts and the resultant mixture containing vinyl chloride is subjected to the action of chlorine in a separate operation to produce 1:1:2-trichlorethane. The acetylene and hydrogen chloride may be passed through hot tubes over catalysts consisting of porous inert carriers charged with salts such as mercury halides or with acidic or basic oxides. Active charcoal is also a suitable catalyst, with or without an addition of a metallic salt such as mercuric chloride. The process of chlorination may be carried out as described in Specification 298,084 (see THE CHEMICAL AGE, Vol. XIX, p. 543), preferably in presence of a solvent, *e.g.*, 1:1:-2-trichlorethane itself, and of a catalyst such as iron turnings.

349,126. DYES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 19, 1930.

Acid wool dyes of the anthraquinone series are obtained by condensing, in aqueous solution and in presence of an acid-binding agent and a copper catalyst, a 1-amino-4-halogen-anthraquinone-2-sulphonic acid with an aromatic diamino-monosulphonic acid containing at least one primary amino group. The sulphonic acid group may be removed from the anthraquinone nucleus by treatment with a feebly-acting alkaline reducing agent such as sodium sulphide. Specified diamino-monosulphonic acids are 4:4¹-diaminodiphenyl-3-sulphonic acid, 4:4¹ diaminodiphenylamine-2-sulphonic acid, and 1-cyclohexylamino-4-aminobenzene-2-sulphonic acid.

349,193. ORGANIC OXYGEN COMPOUNDS. Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques, 40, Rue du Colisée, Paris. International Convention date, January 28, 1930.

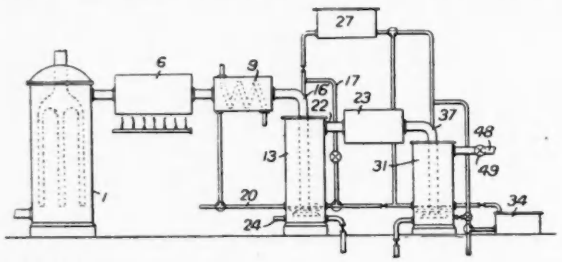
Oxygen-containing compounds, such as the fatty acids and esters, of the first six members of the aliphatic series are produced by reaction of carbon monoxide, *e.g.* at 350° C., with water or water vapour in presence of mixed (single-phase) catalysts containing a rare earth metal or metal compound, other than cerium, associated with at least one alkali or alkaline earth metal compound and one or more of the elements or compounds of the elements, copper, manganese, zinc, cadmium, lead, vanadium, chromium, molybdenum, antimony, bismuth, boron, aluminium, tungsten, silicon, titanium, zirconium, or thorium. Cerium or cerium compounds may be present in admixture with the rare earth metal or metal compound but not in substitution therefor. The catalysts may be prepared as described in Specification 296,049 (see THE CHEMICAL AGE, Vol. XIX, p. 419). An increased proportion of highly electronegative elements in the catalyst is found to increase the proportion of products of an acid character, and the molecular weight of the products is found to increase with the temperature, pressure, and volume of the catalyst.

349,224. AMMONIUM NITRATE AND PHOSPHATE. D. Tyrer, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, April 8, 1930.

Relates to the treatment of solutions containing ammonium phosphate and nitrate, *e.g.*, such as are obtained from phosphate rock by treatment with nitric acid in conjunction with ammonium sulphate and neutralisation of the solution with ammonia. Such solutions are treated to precipitate an insoluble phosphate which is separated from the ammonium nitrate solution and is reconverted into ammonium phosphate by treatment with ammonia. Preferably ferric nitrate is used as precipitant, the solution being maintained very slightly alkaline during the precipitation. The ferric hydroxide obtained may be converted into nitrate for use again or may itself be used for the precipitation.

349,238. SULPHURIC ACID. W. W. Groves, London. From C. Otto and Co., Ges., 9, Christstrasse, Bochum, Germany. Application date, April 14, 1930.

In the production of sulphuric acid from gas mixtures containing hydrogen sulphide in very dilute concentration, together with inert gases such as carbon dioxide, *e.g.*, the waste gases from ammonia saturators, the hydrogen sulphide is burnt with air or oxygen in an indirectly heated furnace to produce sulphur dioxide, the gases are dried first by indirect cooling and then with sulphuric acid, a considerable excess of dried air or oxygen is added, oxidation to sulphur trioxide is effected in a contact furnace, and the trioxide is absorbed



349,238

by the sulphuric acid which is used in the drying step and which circulates in a cyclic path. In the arrangement shown, the gas mixture to be treated is mixed with air in a vessel 1, and is passed through an indirectly heated furnace 6 filled with bauxite, and thence through an indirect cooler 9 into a vessel 13 supplied by a nozzle 16, with a spray of sulphuric acid from a pipe 17 and additionally from a tank 27 when required. The dried gas is then mixed with air, supplied by a pipe 24 and dried by the acid in the vessel 13, and is passed through a contact furnace 23 containing platinised asbestos at 400-450° C. The sulphur trioxide-containing gases pass thence to a second absorption vessel 31 containing sulphuric acid sprayed from a nozzle 37 supplied from the tank 27 or the collecting vessel 34. The gas is thence drawn off through a pipe 48 by a suction device 49, and the acid passes to the collector 34. Ammonia, pyridine, and other nitrogenous compounds may be removed from the original gases by warm sulphuric acid, preferably before the burning operation. Various modifications and refinements of the process and plant are described and illustrated.

349,263. VINYL CHLORIDE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 1, 1929.

Ethylene chloride is converted into vinyl chloride by treatment with a methyl alcoholic solution of an inorganic agent which is capable of binding hydrochloric acid—*e.g.*, sodium hydroxide, potassium hydroxide, or barium hydroxide. The methyl alcohol and the unchanged ethylene chloride are recovered from the residues by fractional distillation after adding a small quantity of water to dissolve the chloride of the metal. In a modification methyl alcohol is introduced gradually into a vessel containing ethylene chloride and caustic soda.

349,287. SULPHUR DIOXIDE. M. Schroeder, 41, Klopstockstrasse, Berlin. International Convention date, May 15, 1929.

To convert gas mixtures containing sulphur dioxide, such as roasting gases, into mixtures richer in sulphur dioxide, the sulphur dioxide in the initial mixture is absorbed by water under pressure and the solution so obtained is treated with a gas such as air at or below atmospheric pressure. Thus, in the preparation of a mixture of sulphur dioxide and air for use in the contact process of sulphuric acid manufacture, the purified roasting gases are compressed and passed through a heat exchanger to the lower end of a tower packed with coke. The gases pass in counter-current to a stream of water sprayed into the upper end of the tower. The gases, freed from sulphur dioxide, are heated by the compressed gases passing through the heat exchanger and after further heating are expanded to assist in driving the compressor. The sulphur dioxide solution collected from the lower end of the absorption tower is passed into the upper end of a degassing tower, and passes downwards in counter-current to a stream of air sucked in by a blower, and the mixture of sulphur dioxide and air is delivered by the blower to the contact oven. The air used may be moderately heated—*e.g.*, by admixture with exhaust steam.

Specifications Accepted with Date of Application

355,257.—Separation of gaseous mixtures of low boiling-point by partial liquefaction. M. Frankl. April 19, 1929.

355,281. Artificial resins, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). May 12, 1930.

355,302. Obtaining iron from iron carbonyl, Process for. Vereinigte Stahlwerke Akt.-Ges. March 8, 1929.

355,308. Carrying out catalytic oxidations. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). April 14, 1930.

355,328. Arylides of aromatic hydroxy-carboxylic acids, Manufacture of. W. W. Groves (*I.G. Farbenindustrie Akt.-Ges.*). May 21, 1930.

355,333. Polyazo dyestuffs. Imperial Chemical Industries, Ltd., and C. Paine. May 22, 1930.

355,334. Coating metal bodies with tungsten bronzes and/or molybdenum bronzes, Process for. Egyesult Izzolampa es Villamossagi Reszvenytarsasag. December 23, 1929.

355,341. Synthetic resins and articles made therefrom. India-Rubber, Gutta Percha, and Telegraph Works Co., Ltd., and F. J. Crosley. May 23, 1930.

355,379. Improving caustic soda solutions for use in the manufacture of viscose, Methods of. Hoesch and Co. May 28, 1929.

355,380. Preparing azo dyes, Method of. L. Mellersh-Jackson (*Ostro Research Laboratories, Inc.*). May 28, 1930.

355,413. Obtaining a condensate from gases, Process of. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. June 29, 1929.

355,422. Zinc alloys. Illinois Zinc Co. October 18, 1929.

355,425. Vulcanised rubber and the like, Manufacture of. Imperial Chemical Industries, Ltd. (*E. I. du Pont de Nemours and Co.*). June 27, 1930.

355,445. Extraction of phenol, phenol homologues, and other hydroxy aromatic compounds from tar oils and mineral oils. J. G. Peake. July 9, 1930.

355,456. Magnetic alloys. Callender's Cable and Construction Co., Ltd., and S. Beckinsale. July 14, 1930.

355,464. Amino-diazoanthraquinones and anthraquinone derivatives therefrom, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 17, 1929. Addition to 264,879.

355,484. Saturated alcohols of high molecular weight, Production of. Deutsche Hydrierwerke Akt.-Ges. August 3, 1929.

355,492. Nitrocellulose, Manufacture of. H. C. Heide (*E. Tschudin*). August 11, 1930.

355,538. Organic arsenic compounds, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 13, 1929. Addition to 318,491.

355,552. Electrodes for use in electric arc welding or the fusion-deposition of metals. Quasi-Arc Co., Ltd., and E. F. Newell. September 25, 1930.

355,573. Polymerisation products, Manufacture and production of. I.G. Farbenindustrie Akt.-Ges. January 28, 1930.

355,574. Substances arresting blood-coagulation, Preparation of. Hoffmann-La Roche and Co. Akt.-Ges. November 4, 1929.

355,597. Carboxylic acid derivatives of the anthraquinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 12, 1929. Addition to 277,670.

355,610. Converting ferro-phosphorus rich in silicon into ferro-phosphorus of high phosphorus content free from or poor in silicon. I.G. Farbenindustrie Akt.-Ges. December 17, 1929.

355,613. Producing commercial antimony oxide, Process for. Antimon Berg und Huttenwerke Akt.-Ges. November 29, 1929.

355,634. Preparing transparent artificial resins by condensing phenols and formaldehyde, Process for. G. Pechin (*née* Lacroux). January 15, 1931.

355,637. Fertilisers, Manufacture and production of. Imperial Chemical Industries, Ltd. January 24, 1930.

Applications for Patents

[*In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.*]

Bampfylde, J. W., and British and Dominions Feralloy Ltd. Catalytic treatment of hydrocarbons, etc. 24,536. September 1.

British and Dominions Feralloy, Ltd. Modifying resistivity of iron-aluminium alloys. 24,873. September 4.

California Fruit Growers Exchange. Manufacture of pectin products. 24,564. September 1. (United States, September 8, 1930.)

Carpmael, A. (I.G. Farbenindustrie Akt.-Ges.). Manufacture of high molecular alcohols of the fatty series. 24,777. September 3.

—— Manufacture of therapeutic compounds of the heterocyclic series. 24,778. September 3.

Conpagnie Technique des Pétroles. Purification of hydrocarbons. 24,670. September 2. (France, September 23, 1930.)

Du Pont de Nemours and Co., E. I. Manufacture of sulphur dyes. 24,856. September 4. (United States, September 5, 1930.)

Durand and Huguenin Akt.-Ges. Manufacture of sulphamic acids of aminoanthra-hydroquinone-disulphuric acid esters, etc. 24,874. September 4. (Germany, September 5, 1930.)

Electric Smelting and Aluminium Co. Precipitating and separating alumina hydrate from solutions of alkali metal aluminates. 24,849. September 4. (United States, October 10, 1930.)

Empson, A. W., and J. Stone and Co., Ltd. Separation of colloidal etc., suspensions from liquids. 24,541. September 1.

Feuer, E. Production of zinc white. 24,584. September 1. (Germany, October 13, 1930.)

Handasyde, E. S. Distillation of carbonaceous materials. 24,628. September 2.

(I.G. Farbenindustrie Akt.-Ges.) Johnson, J. Y. Apparatus for manufacture of neutral products from oils, etc. 24,408. August 31.

—— Johnson J. Y. Manufacture of condensation products from aromatic hydrocarbons. 24,549. September 1. (December 17, 1930.)

—— Johnson, J. Y. Improving animals hides and leather. 24,647. September 2.

—— Johnson, J. Y. Coating adsorbent materials. 24,770. September 3.

—— Manufacture of high molecular alcohols of the fatty series. 24,777. September 3.

—— Manufacture of therapeutic compounds of the heterocyclic series. 24,778. September 3.

—— Manufacture of mixed yarns. 24,876, 24,877. September 4.

—— Johnson, J. Y. Manufacture of insulating articles. 24,987. September 5.

—— Johnson, J. Y. Manufacture of hydroxy ketones. 24,988. September 5.

—— Johnson, J. Y. Manufacture of mixed fertilisers. 24,989. September 5.

I.G. Farbenindustrie Akt.-Ges. Manufacture of silk fibroin soluble in water. 24,769. September 3. (Germany, December 23, 1930.)

Imperial Chemical Industries, Ltd. Tetrakisazo dyestuffs. 24,855. September 4.

—— and Wheeler ,T. S. Producing chlorinated derivatives of benzene. 24,907. September 4.

Jackson, L. Mellersh-. (Deutsche Edelstahlwerke Akt.-Ges.). Manufacture of sintered alloys. 24,677. September 2.

Kemp, P. Production of zinc-white. 24,584. September 1. (Germany, October 13, 1930.)

Metallges. Akt.-Ges. Decolorizing heavy spar. 24,540. September 1. (Germany, November 25, 1930.)

—— Manufacture of sulphuric acid by contact process. 24,693. September 2. (Germany, October 25, 1930.)

Moritz, R. Lead chambers for manufacture of sulphuric acid. 24,787. September 3. (France, September 3, 1930.)

Naugatuck Chemical Co. Manufacture of mercapto benzo-thiazole. 24,884. September 4. (United States, September 22, 1930.)

Paine, C. Tetrakisazo dyestuffs. 24,855. September 4.

Pollopas, Ltd. Manufacture of condensation products of urea. 24,452. August 31. (Germany, September 1, 1930.)

Salerni, P. M. Treatment of carbonaceous materials. 24,589. September 1.

Soc. of Chemical Industry in Basle. Manufacture of dyeings. 24,767. September 3. (Switzerland, September 3, 1930.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£17 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K., or c.i.f. export
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity: ground ½d. per lb. extra.
POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8½d. per lb. d/d U.K., or c.i.f. export.
SALAMMONIAC.—Firsts lump, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per tor d/d station in bags.
SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3¾d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3¾d. per lb. d/d U.K., or c.i.f. export.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¾d. to 6¾d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
ACID CRESYLIC 99/100.—1s. 9d. to 1s. 10d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 1s. 11d. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
BENZOLE.—Prices at works: Crude, 5½d. to 6½d. per gall.; Standard Motor, 1s. to 1s. 1d. per gall. 90%.—1s. 1d. to 1s. 2d. per gall. Pure, 1s. 4d. to 1s 5d. per gall.
TOLUOLE.—90%, 1s. 8d. to 1s. 9d. per gall. Pure, 1s. 10d. to 1s. 11d. per gall.
XYLOL.—1s. 7d. to 1s. 8d. per gall. Pure, 1s. 10d to 1s. 11d. per gall.
CREOSOTE.—Standard specification, for export, 5d. to 5½d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.
NAPHTHA.—Solvent, 90/100, 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £10 per ton, in bags.
PITCH.—Medium soft, 52s. 6d. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. to 3s. 3d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s 3d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—7½d. per lb.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7½d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer s works.
a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.
B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—8½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 5s. to £7 10s. per ton. Grey, £12 per ton. Liquor, 9d. per gall.
ACETONE.—£63 to £65 per ton.
CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—2s. 9d. to 2s. 11s. per gall., according to quantity. Solvent, 3s. 9d. per gall.
WOOD TAR.—£4 to £5 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON BLACK.—3d. to 4d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; DARK, 4d. to 4½d. per lb.
LAMP BLACK.—£28 per ton.
LITHOPONE, 30%.—£18 to £20 per ton.
SULPHUR.—£9 10s. to £13 per ton.
SULPHUR CHLORIDE.—4d. to 7d. per lb., according to quality.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
SULPHUR PRECIP. COMMERCIAL.—£40 to £45 per ton.
VERMILION, PALE OR DEEP.—6s. 2d. to 6s. 8d. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. to 1s. 6d. per lb.
ACID, ACETIC, PURE, 80%.—£35 5s. per ton d/d address U.K. in casks.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—10½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ¼-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—10½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 6d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼-cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—2s. 10d. per lb.
BISMUTH CARBONATE.—7s. 9d. per lb.
BISMUTH CITRATE.—8s. 7d. per lb.
BISMUTH SALICYLATE.—7s. 11d. per lb.
BISMUTH SUBNITRATE.—6s. 9d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 6d. per lb.
BISMUTH OXIDE.—10s. 9d. per lb.
BISMUTH SUBCHLORIDE.—10s. 5d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2½d. per lb.; 6 W. Qts., 1s. per lb.; 12 W. Qts., 10½d. per lb.; 36 W. Qts., 10d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.
CAMPHOR.—Refined flowers, 2s. 8d. to 2s. 10d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.
CHLOROFORM.—2s. 4d. per lb.
ETHERS.—S.G. ·730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—30s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz.
MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 13s. 6d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 7s. 4d. to 7s. 5d. per lb., levig., 6s. 11d. to 7s. per lb.; Corrosive Sublimate, Lump, 5s. 10d. to 5s. 11d. per lb., Powder, 5s. 3d. to 5s. 4d. per lb.; White Precipitate, Lump, 5s. 10d. to 5s. 11d. per lb., Powder, 5s. 11d. to 6s. per lb.; Calomel, 6s. 3d. to 6s. 4d. per lb.; Yellow Oxide, 6s. 9d. to 6s. 10d. per lb.; Persulph, B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 6s. 5d. to 6s. 6d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 4d. per lb.
PARAFORMALDEHYDE.—1s. 6d. per lb.
PARALDEHYDE.—1s. 1d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—76s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—50s. per cwt. d/dLondon, kegs free.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.
SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 6d. to 1s. 7½d. per lb.
SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb. for 28-lb. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.
ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—8s. 9d. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—8s. 6d. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 2d. per lb.
CINNAMIC ALDEHYDE NATURAL.—10s. 6d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—7s. 3d. per lb.
CITRAL.—6s. per lb.
ETHYL CINNAMATE.—6s. 9d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—7s. 6d. per lb.
GERANIOL.—6s. to 10s. per lb.
GERANIOL (FROM PALMAROSA).—14s. per lb.
HELIOTROPINE.—5s. 6d. per lb.
ISO EUGENOL.—9s. per lb.
LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.
METHYL ANTHRANILATE.—6s. per lb.
METHYL BENZOATE.—4s. 3d. per lb.
MUSK XYLOL.—6s. 6d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.
RHODINOL.—40s. per lb.
SAFROL—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.
BERGAMOT OIL.—8s. 6d. per lb.
BOURBON GERANIUM OIL.—17s. 6d. per lb.
CAMPHOR OIL.—White, 90s. per cwt.; Brown, 90s. per cwt.
CANANGA.—Java, 7s. per lb.
CINNAMON OIL LEAF.—4s. per oz.
CITRONELLA OIL.—Java, 2s. 4d. per lb., c.i.f. Pure Ceylon, 2s. per lb.
CLOVE OIL, 90/92%.—6s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%—1s. 4d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb
LEMON OIL.—4s. 3d. per lb.
LEMONGRASS OIL.—2s. 9d. per lb.
ORANGE, SWEET.—8s. per lb.
OTTO OF ROSE.—Anatolian, 40s. per oz.; Bulgarian, 60s. per oz.
PALMA ROSA.—8s. 9d. per lb.
PEPPERMINT.—WayneCounty, 7s. 6d. per lb.; Japanese, 4s. 9d. per lb.
PETITGRAIN.—5s. per lb.
SANDALWOOD.—Mysore, 28s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 9, 1931.

BUSINESS during the current week has been fairly steady with prices if anything somewhat firmer.

General Chemicals

ACETONE.—In daily demand at £59 61 per ton, according to quantity.

ACID ACETIC.—Technical 80%, £34 5s. to £36 5s. per ton. Pure £1 per ton extra, and in daily request.

ACID, FORMIC.—£36 per ton, with a steady demand.

ACID, CITRIC is still very quiet at about 10½d. per lb.

ACID, LACTIC.—The improved demand continues at £38 per ton for the 40% by weight.

ACID, OXALIC.—Continues firm at £34 per ton, in casks, and £35 per ton in 1-cwt. kegs, carriage paid, with a good steady demand.

ACID, TARTARIC is a little easier and quiet at about 10d. to 10¼d. per lb., less 5%.

ALUMINA SULPHATE is unchanged.

ARSENIC continues firm at about £19 to £19 10s. per ton for continental makes.

CREAM OF TARTAR.—A little easier at about 74s. to 75s. per cwt.

COPPER SULPHATE.—Unchanged, £18 10s. per ton.

FORMALDEHYDE.—In good steady demand at about £27 per ton.

LEAD ACETATE is unchanged at £31 5s. for white and £30 15s. per ton for brown.

LITHOPONE.—£18 to £22 per ton according to grade and quantity, with a steady demand.

POTASSIUM BICHROMATE.—Unchanged and firm at 4¼d. per lb., with usual discounts for contracts.

POTASSIUM CHLORATE continues firm at £28 32 per ton.

PERMANGANATE OF POTASH needle crystals B.P. firm at 5¼d. to 5½d. per lb., ex warehouse.

SODA BICHROMATE.—Firm at 3½d. per lb., with the usual discounts for contracts with a good demand.

SODIUM HYPOSULPHITE photographic crystals, £14 5s. per ton and in good demand, with commercial crystals £8 per ton.

SODIUM PRUSSIATE firm at 4½d. to 5¼d. per lb., according to quantity.

TARTAR EMETIC is quiet at about 10½d. per lb.

ZINC SULPHATE is unchanged at £10 10s. per ton.

Coal Tar Products

THERE is no change to report in the coal tar products market, prices remaining the same as last week.

MOTOR BENZOL.—Remains at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Unchanged at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Obtainable at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Quoted at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Obtainable at about 1s. 6d. per gallon for 98/100% quality, f.o.r., and at about 1s. 4d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Quoted at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Unaltered, at 45s. to 47s. 6d. per ton f.o.b. East Coast port for forward delivery.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—During the week a weaker tendency developed in the market, and this material was offered at £4 17s. 6d. per ton, f.o.b. U.K. port, in single bags. It is understood that none of the transactions were small. *Home.*—It is reported that merchants are still buying for spring delivery, as it is expected that there will be no further reduction in price.

Nitrate of Soda.—Up to the present prices have not been announced for the U.K., and the prices in operation in other markets appear to be well above those for sulphate of ammonia. It is anticipated that new price scales will be announced shortly.

Scottish Coal Tar Products

WHILE practically no change can be recorded in prices, enquiries are more numerous, particularly for export. Creosote oil is not too plentiful in this area and the reductions reported last week have proved temporary.

Cresylic Acid.—Export business is on the increase but quotations are unchanged. Pale, 99/100%, 1s. 5d. to 1s. 6d. per gallon; pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 2d. to 1s. 3d. per gallon; high boiling, 2s. 6d. to 3s. per gallon; all ex makers' works.

Carbolic Sixties.—More interest is being shown in this product, but value remains easy at 1s. 1d. to 1s. 3d. per gallon, according to percentage of water.

Creosote Oil.—Quotations have been increased to previous level. Specification oils, 2½d. to 3d. per gallon; washed oil, 3¼d. to 3½d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; all in bulk ex works.

Coal Tar Pitch.—Distillers are not anxious to sell for forward delivery and value is purely nominal at about 45s. per ton, f.o.b. Glasgow for export, and about 40s. per ton, ex works for home trade.

Blast Furnace Pitch.—Controlled prices remain at 30s. per ton, f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Large quantities continue to be called for but new business is not plentiful. Quotations are steady at 2½d. to 2⅝d. per gallon f.o.r. in buyers' packages.

Blast Furnace Tar.—Without interest at 2⅜d. per gallon, f.o.r.

Crude Naphtha.—Production remains low and value is steady at 4¾d. to 5¼d. per gallon according to quality.

Water White Products are receiving little or no attention. Motor benzole, 1s. 2½d. to 1s. 3½d. per gallon; 90/160 solvent, 1s. 1½d. to 1s. 2½d. per gallon; and 90/190, heavy solvent, 11½d. to 1s. 0½d. per gallon; all f.o.r. in bulk quantities.

Latest Oil Prices

LONDON, September 9.—LINSEED OIL was steady. Spot, ex mill, £15 15s., September, £12 10s.; September-December, £12 17s. 6d.; January-April, £14 2s. 6d.; May-August, £14 17s. 6d., naked. RAPE OIL was inactive. Crude extracted, £25 10s.; technical refined, £27, naked, ex wharf. COTTON OIL was slow. Egyptian crude, £17 10s.; refined common edible, £20 10s.; deodorised, £22 10s., naked, ex mill. TURPENTINE was steady. American, spot, 47s.; October-December, 36s. epr cwt.

HULL.—LINSEED OIL, spot and September, closed at £13 10s.; October-December at £13 12s. 6d.; January-April at £14 5s.; May-August at £15, naked. COTTON OIL, Egyptian, crude, spot, £18 10s.; edible, refined, spot, £20 15s.; technical, spot, £20 10s.; deodorised, £22 15s. PALM KERNEL OIL, crude, naked, f.m.q., spot, £18 10s. GROUNDNUT OIL, crushed/extracted, spot, £23 10s.; deodorised, £27 10s. RAPE OIL, crushed/extracted, £25; refined, £27. SOYA OIL, crushed/extracted, spot, £17; deodorised, £20 10s. per ton. COD OIL, 15s. 6d. per cwt. CASTOR OIL, pharmacy, spot, 40s.; firsts, 35s.; seconds, 33s. per cwt. TURPENTINE, American spot, 40s. per cwt.

South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The call for pitch continues to be slow and sporadic, and, until there is an improvement in patent fuel shipments, it is unlikely that there will be any brightening in the pitch situation. Business at present is confined to small, near-date parcels, with values unchanged. Road tar is slightly better with quotations unchanged round about 13s. per 40-gallon barrel delivered. Refined tars have a fair call, with values unchanged for coke-oven and gasworks tar. Naphthas continue to have a poor demand. Solvent has a less than moderate call, while heavy has practically no call. Creosote remains weak, but motor benzol continues to be a fair feature. Patent fuel and coke exports are unsatisfactory. Patent fuel prices, for export, are:—19s. to 19s. 9d., ex ship Cardiff; 19s. to 19s. 6d. ex ship Swansea. Coke prices are:—Best foundry, 32s. 6d. to 36s. 6d; good foundry, 22s. 6d. to 25s.; furnace, 16s. 6d. to 17s. 6d.

Exports of Calcium Carbide

EXPORTS of calcium carbide from Yugoslavia during 1930 were 11,970 metric tons, valued at £85,000, of which 7,168 tons went to Great Britain, 1,393 tons to Germany, and 824 tons to Italy. There are four electro-chemical plants producing calcium carbide in Yugoslavia. The potential annual production of calcium carbide in Yugoslavia is estimated at over 50,000 metric tons.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, September 8, 1931.

BUSINESS still shows a steady improvement in the Scottish heavy chemical market.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £45 to £56 per ton; pure, £35 5s. per ton; technical, 80%, £34 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23 per ton; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at 3¾d. per lb., ex store. On offer from the Continent at 3¾d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality, £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 10½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £26 per ton, ex wharf. On offer for shipment from China at about £23 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £23 10s. per ton, ex wharf. Spot material still on offer at £24 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 7s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store. Continental on offer at about £27 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £30 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £32 to £34 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £23 10s. per ton ex store. Offered from the Continent at £22 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Trade Publications

THE ALUMINIUM PLANT AND VESSEL CO., LTD., of Point Pleasant, Wandsworth, S.W.18, have recently issued a handy index to the complete range of foodstuff plant included in their manufactures. A welded copper vacuum steam jacketed pan, pure nickel apparatus for the continuous extraction of solids by a volatile solvent, and vacuum concentration plant in aluminium, pure nickel and tinned gunmetal, are illustrated, in addition to plant restricted to foodstuff manufacture, and reference is made throughout to other literature and leaflets which are available in giving fuller details.

A NEW LEAFLET dealing with rotary air compressors and vacuum pumps has been issued by Bernard Holland and Co., of 17, Victoria Street, London, S.W.1.

THE JULY ISSUE of the *B.T.L. Monthly Bulletin*, published by Baird and Tatlock (London), Ltd., of 14–17, Cross Street, Hatton Garden, E.C.1, deals with a new conductivity water still and water container designed by Dr. Arthur I. Vogel. Except for the conductivity water containers, which are of Purex glass, this still is constructed entirely of metal, the various sections being connected by screw unions to make all parts easily accessible. It operates with ordinary distilled water and can be made to yield water of a specific conductivity of 0·8, 1·3 or 1·5 gemmho at 25° C. Its output is about 8 litres per day. An introductory article outlines the features of conductivity water and the need for its employment in exact physico-chemical work.

WELDED ROAD WAGON TANKS for inflammable liquids are illustrated in a recent leaflet of Robert Jenkins and Co., Ltd., of Rotherham.

Control of Narcotics in Switzerland

A DECREE, dated August 4 and effective on August 10, extends the control of the trade in narcotics in Switzerland to cover benzylmorphine (peronine), ecgonine and esters (ether salts) thereof, and all preparations containing ecgonine or an ester thereof (but not preparations containing benzylmorphine). Ecgonine esters are subject to control even when shown to be deprived of properties liable to cause toxicomania, and of such a composition that the ecgonine cannot be recovered. The products which are now subjected to control require a licence in order to be imported into or exported from Switzerland.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, September 10, 1931.

After the weakness that has been in evidence in more than one section of the chemical market during the past week or two, prices appear to have settled down for the time being, although it would not be surprising to see further "cuts" before long in one or two lines which are directly affected by movements in other markets. Business this week has been of a patchy character, and the majority of the orders placed have been for relatively small quantities for near-date deliveries. The undertone during the past few days seems to have been affected by political and financial uncertainties, last week's promise of slightly better things not having been maintained.

Heavy Chemicals

Inquiry for bicarbonate of soda this week has been on moderate lines, with quotations firm at £10 10s. per ton. The demand for hyposulphite of soda has been rather slow, but at about £9 5s. per ton for the commercial grade and from £15 for the photographic there has been no change in the price position. The movement of caustic soda, mainly against contracts, has been on a fair scale, contract offers ranging from £12 15s. to £14 per ton, according to quality. Saltcake is quoted at from £2 15s. up to £3 per ton, quiet sales having been reported this week. Dibasic phosphate of soda is on offer at from £10 to £10 10s. per ton, with the demand on moderate lines. Interest in chlorate of soda is rather slow still, but values are fairly steady at about £26 10s. per ton. A quiet business is going through in prussiate of soda, offers of which keep up at from 4¾d. to 5¼d. per lb., according to quantity. There is a moderate call for bichromate of soda, which is steady at 3½d. per lb., less 1 to 2½ per cent. The demand for sulphide of sodium shows no appreciable improvement, but prices in this section are about unchanged at £7 15s. per ton for the commercial grade and round £9 for the 60–65 per cent. concentrated solid material. Alkali is firm at round £6 per ton, and a moderate trade is being done.

There has been no special feature about the demand for caustic potash; current offers of this material are in the neighbourhood of £27 5s. per ton. Sales of permanganate of potash have been confined to small lots, but there has been no alteration so far as prices are concerned, the B.P. quality being quoted at about 5¼d. per lb. and the commercial at 5d. Inquiry for yellow prussiate of potash has been on moderate lines, with values well held at from 6¾d. to 7¼d. per lb., according to quantity. No more than a quiet demand has been experienced in the case of bichromate of potash, which is quoted on the basis of 4¼d. per lb., less 1 to 2½ per cent. Chlorate of potash is quiet, although prices seem to be fairly steady at the moment at about £27 10s. per ton. Carbonate of potash is still easy in tendency at from £23 10s. to £24 per ton.

Sales of sulphate of copper are relatively slow and values are not too certain, current rates being down to about £18 per ton, f.o.b. White powdered Cornish arsenic is in short supply and values are firm at round £23 10s. per ton at the mines. No more than a quiet business is passing in the acetates of lime, which are on offer at from £7 to £7 10s. per ton for the brown material and round £12 for the grey. The acetates of lead are maintained at the revised rates of £31 12s. 6d. per ton for the brown and £32 12s. 6d. for the white, in ton lots, with nitrate in quiet demand at about £28 10s. per ton.

Acids and Tar Products

Gradually lower levels are being reached by citric and tartaric acids, and interest from buyers is on a restricted scale; citric is down to about 10¼d. per lb. and tartaric at round 10d. There is a moderate call for oxalic acid and prices are steady at £1 14s. 6d. per cwt., ex store. Acetic acid is unchanged at £35 per ton for the 80 per cent. commercial quality and £49 for the technical glacial, but no great weight of business is being done.

Pitch prices are maintained at the higher range of 50s. to 52s. 6d. per ton, f.o.b., and moderate bookings for export are reported. Creosote oil is in quiet demand still at from 3d. to 4¼d. per gallon, naked. Solvent naphtha is dull; offers are at about 1s. 1½d. per gallon, naked. Crude carbolic is quoted at 1s. 2d. to 1s. 2½d. per gallon, and crystals at 5¼d. per lb.

Company News

Amalgamated Zinc (de Bavay's), Ltd.—The directors recommend the payment, on October 8th, of a dividend at the rate of 5 per cent. per annum for the six months to June 30, 1931.

Boots Pure Drug Co., Ltd.—An interim dividend at the rate of 24 per cent. per annum, less tax, on the ordinary shares for the quarter, payable October 1st, is recommended by the directors. This is the same as in previous quarters.

British Aluminium Co., Ltd.—At a meeting of the directors on Tuesday, it was decided to await the full year's trading results before considering the payment of a dividend on the 1,001,034 £1 ordinary shares. The dividend on the 1,000,000 £1 preference shares for the six months to June 30th last was declared, payable on October 1.

Onverwacht Platinum.—The report for the year to June 30 last states that the company has followed a policy of conserving cash resources with a view to taking advantage of any suitable opportunity which may present itself in the future development of the platinum industry. Realisation of equipment, etc., has progressed slowly owing to small demand for second-hand material and distance of property from industrial centres. There still remains for disposal certain plant and buildings at mine, which is in charge of caretaker. Cash and cash assets at June 30, 1930, amounted to £53,963, to which must be added £3,176 net sum realised from sale of plant and equipment, making £57,139. After deducting net expenditure for the year of £2,384, there remains £54,755.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Panama.—A firm of commission agents in Panama desire to obtain the representation of British manufacturers of tallow, silicate of soda, soda ash (for candle and soap factories). (Ref. No. 246.)

Egypt.—A firm established in Alexandria desire to obtain the agencies of United Kingdom manufacturers of pharmaceutical and photographic chemicals, and industrial chemicals, in particular, for the tanning industry. (Ref. No. 241.)

France.—An agent in Nantes is desirous of securing the representation of a British firm manufacturing sulphate of copper. (Ref. No. 236.)

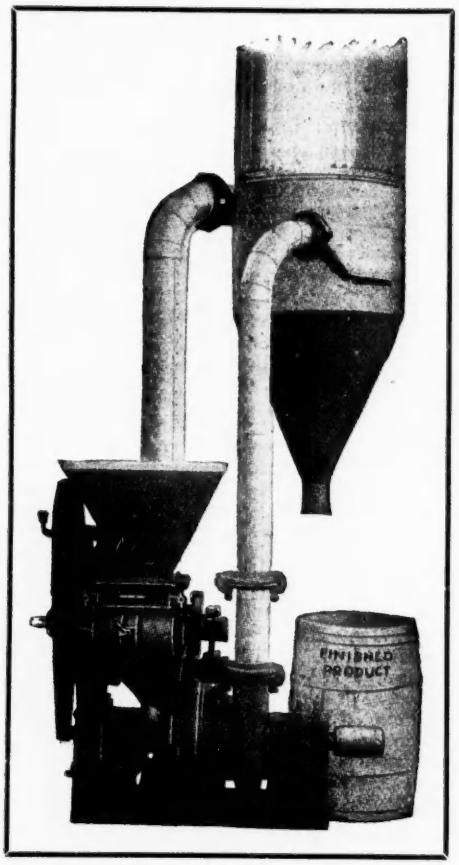
Canada.—A manufacturers' agent in Montreal desires to obtain the representation of United Kingdom producers of synthetic gums and titanium pigments. He is also interested in chemicals for the rubber, paint, varnish, printing-ink, textile, soap and pharmaceutical trades, and in stearic and oleic acids, zinc oxides and lithopone. (Ref. No. 214.)

British India.—The Director of Contracts, Army Headquarters, Simla, invites tenders for 3,500 cwt. of brimstone. Forms of tender obtainable from the Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, at a fee of 5s. Tenders must be sent direct to the Director of Contracts, Army Headquarters, Simla, by registered post, to reach him not later than October 6.

New Test for Predicting Durability of Varnishes

A new laboratory test for predicting the durability of varnishes and related materials has been developed in the United States Bureau of Standards. This test, which can be made in a single day, consists in exposing the varnish film to an intense light, as a carbon arc, and at the end of each hour bending the varnish-coated metal panel over a rod of fixed diameter. It has been found that the more durable the varnish, the longer it may be exposed to the light before it will crack on bending. The advantages of the new test over those now in use lie in the simplicity of preparing the samples and making the test, the speed with which results can be obtained, and its applicability to such a wide variety of coatings.

Dust danger eliminated with RAYMOND "OOOO" PULVERISER



In addition to this highly important factor, especially when grinding materials injurious to health,

The RAYMOND PULVERISER
IS
very widely adaptable.

Its efficiency is established by the ever-increasing number of important manufacturers installing this pulveriser.

The Raymond is compact and easy to erect. No special attention is required during operation.

The Raymond will pulverise material containing more moisture than can be efficiently handled with any other kind of mill because of its air separation principle.

MINING & INDUSTRIAL EQUIPMENT LTD.
ASSOCIATED WITH — INTERNATIONAL COMBUSTION LTD.
11, Southampton Row, London, W.C.1.
Works: Derby & Erith.

TELEPHONE:
HOLBORN 7277 (3 LINES)

TELEGRAMS & CABLES:
HARDRAYMIL WESTCENT LONDON

Tariff Changes

BELGIUM.—The *Moniteur Belge* for August 21 contains a Decree, dated August 20 and effective as from the date of publication, giving a list of the nitrogenous fertilisers which are subject to licence requirements. These are: (*a*) Nitrogen manures, such as nitrate of soda, natural or chemical, nitrate of ammonia, nitrate of lime, "Kalkonitro," and "Kalkammon" saltpetre; (*b*) ammoniacal manures, such as sulphate of ammonia and chlorides of ammonia; (*c*) amide manures, such as cyanamide and urea; (*d*) compound manures, such as phosphate and superphosphate of ammonia, sulphonitrate of ammonia, nitrate of potash, "Nitrophoska," and nitrophosphorite; (*e*) The following nitrogenous products—anhydrous ammonia, ammonia solutions of any degree of concentration, nitric acids of any degree of concentration, nitrosulphuric acids, sulphate of ammonia (refined or commercially pure), nitrate of ammonia (refined or commercially pure), nitrate of soda (pure or refined), nitrate of potash, refined, carbonates of ammonia, chlorates of ammonia, chloride of ammonia, and pure urea.

ITALY.—The *Gazzetta Ufficiale* for August 21 contains a Royal Decree-Law, dated July 29 and in force as from August 21, which modifies the Customs treatment of nitrogenous products as follows:—

	Former Import Duty	Revised "General" Tariff Duty
	Paper lire per 100 kilogs.	
Nitric acid	11	55
Ammonia:—		
(*a*) Compressed	44	110
(*b*) In solution	18·35	55
Concentrated ammoniacal liquor from the distillation of coal for gas	Free	55
Carbonate of ammonia	44	90
Chloride of ammonia	44	75
Nitrates:—		
(*a*) Of ammonia	29·40	110
(*f*) Of potash	7·35	110
(*g*) Of sodium, refined	11	75
Nitrates of potash and of soda	36·70	75
Nitrogenous fertilisers:—		
1. Nitrate of soda, crude	Free	55
2. Nitrate of lime	Free	55
3. Calcium cyanamide	11	55
4. Sulphate of ammonia	3·65	55
5. Impure nitrate of ammonia (for agriculture)	3·65	100
Mixed nitrogenous fertilisers	3·65	75
Unspecified nitrogenous fertilisers	Free	75

The Ministry of Finance is empowered to permit the import of products of the kinds affected, under the Tariff conditions formerly in force, in quantities necessary for Italian consumption. Under this provision, a Ministerial Decree was issued on August 17 authorising the duty-free import, during 1931, of 60,000 metric tons of crude nitrate of soda.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the registration of the following trade marks can be lodged up to October 2, 1931.

VELWHITE.

518,763. Class 1. Calcium sulphate prepared for use in manufactures. Peter Spence and Sons, Ltd., National Buildings, St. Mary's Parsonage, Manchester; chemical manufacturers. December 17, 1930.

LISSAPON.

524,599. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anticorrosives. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. July 25, 1931.

PERMUTIT.

524,410. Class 2. Chemical substances for purifying water. United Water Softeners, Ltd., Aldwych House, Aldwych, London, W.C.2; manufacturers. July 17, 1931.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

"B. AND L." POWDERED FUEL, LTD., London, S.W. (M. 12/9/31.) Registered August 27, £1,000 charge, to Sensible Heat Distillation Ltd., York Mansions, Petty France, S.W.; charged on certain letters patent, etc. *Nil. October 14, 1930.

BROTEX CELLULOSE FIBRES, LTD., London, W. (M. 12/9/31.) Registered August 24, £1,275 (not ex.), etc., further charge (supplemental to charge dated June 18, 1931, and further charge dated August 7, 1931) to Capt. J. A. Holder, Beaulieu, and others; charged on interest in certain secret processes, etc. *Nil. January 13, 1931.

London Gazette, &c.

Company Winding Up Voluntarily

GRAPE PRODUCE, LTD. (C.W.U.V. 12/9/31.) By special resolution, September 4. Mr. Leslie Barnett Prince, 100, Palmerston House, Old Broad Street, London, E.C.2, appointed liquidator.

New Companies Registered

CAULINUTE PRODUCTS, LTD., 10 and 12, Bishopsgate, London, E.C.2. Registered September 7. Nominal capital, £1,500 in £1 shares. To acquire from W. B. Cowell the benefit of his nutrients and sterilising agents or other substances called by him by the name of "Caulinute," and of his "Rodarub" road making process, and to carry on the business of chemists, roadmakers and contractors, etc. Directors: E. E. Soden, W. B. Cowell, C. J. S. Harper.

LEO OIL PRODUCTS, LTD., Grand Buildings, Trafalgar Square, London, W.C.2. Registered September 2. Nominal capital, £1,000 in £1 shares. Buyers, sellers, manufacturers, refiners and preparers of and dealers in all kinds of oils, greases, lubricants and oleaginous and saponaceous substances, etc. Directors:—H. Singer, Lily Singer, F. W. Butterworth, G. J. Barnard.

METALION, LTD.—Registered September 3. Nominal capital, £2,100 in 2,000 10 per cent. participating preference shares of £1 and 2,000 ordinary shares of 1s. each. To acquire and exploit the exclusive rights for the British Empire in the invention of R. J. Fletcher relating to a secret process of the electro-deposition and cleaning of metals, etc. Directors:—A. E. Tolley and A. W. Hajduska, 8, King William Street, London, E.C.4.

FREDK. G. WILLIAMS, LTD.—Registered September 2. Nominal capital £2,000 in £1 shares. To acquire the business of a colour and chemical merchant, carried on by Fredk. G. Williams, at 119, Chapel Street, Salford, and to carry on the same and the business of wholesale and retail chemists, druggists, oil and colourmen, etc. Directors:—F. G. Williams, 62, Framingham Road, Brooklands, Ches.

Instruments for Control of Chemical Plant

INSTRUMENTS for the scientific control of chemical plant, shown by Negretti and Zambra, of 38, Holborn Viaduct, London, E.C.1, at the recent plant exhibition included mercury-in-steel and electrical indicating and recording distance type thermometers; temperature control apparatus; thermometers for chemical plant use; hygrometers; draught gauges; and recording absolute pressure gauges. Many of these instruments are in use at some of the largest chemical plants in this country, and are also a standard fitting in boiler houses and on refrigeration machines. Instruments made by this firm are generally recognised as being of the very highest quality, and their accuracy is fully appreciated throughout the chemical industry.